# Object Oriented Programming

## Background

* .interface IShape defines method .Draw.
* .class Circle. implements .IShape. and the method .Draw.
* .class Rectangle implements .IShape. and the method .Draw.
* .class Square extends .Rectangle. and overrides the method .Draw.

## Questions

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| 1) Is this statement valid? If not, why? |
| IShape circle = new Circle(); |

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| 2) Is this statement valid? If not, why? |
| Rectangle rectangle = new Rectangle(); |

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| 3) Is this statement valid? If not, why? |
| Rectangle rectangle = new Square(); |

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| 4) Is this statement valid? If not, why? |
| Circle circle = new Square(); |

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| 5) Is this statement valid? If not, why? |
| IShape shape = new IShape(); |

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| 6) What is the output of these statements? If the statements will not compile, briefly explain why. |
| Circle circle = new Circle(); |
| circle.Draw(); |

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| 7) What is the output of these statements? If the statements will not compile, briefly explain why. |
| Rectangle rectangle = new Rectangle(); |
| rectangle.Draw(); |
| rectangle = new Square(); |
| rectangle.Draw(); |

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| 8) What is the output of these statements? If the statements will not compile, briefly explain why. |
| IShape shape = new Circle(); |
| shape.Draw(); |
| shape = new Rectangle(); |
| shape.Draw(); |

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| 9) What is the output of these statements? If the statements will not compile, briefly explain why. |
| new Circle().Draw(); |

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| 10) What is the output of these statements? If the statements will not compile, briefly explain why. |
| new IShape().Draw(); |

# Algorithms

**For this question, we’d like you to demonstrate your algorithm implementation skills.  Please build your solution on** [**https://ideone.com**](https://ideone.com/) **and send us a link to your completed answer.**

## Question:

Write the code to support the printing of a martini glass to the console using ASCII characters.  It should support the taking of an integer value that represents the size of martini glass to output.  The output should look like the examples below.  Implementation ideally in C#, but if necessary, Java or C++ can be used.

*Example Output: PrintGlass(4);*

|  |
| --- |
| 0000000 |
| 00000 |
| 000 |
| 0 |
| | |
| | |
| | |
| | |
| ======= |

*Example Output: PrintGlass(5);*

|  |
| --- |
| 000000000 |
| 0000000 |
| 00000 |
| 000 |
| 0 |
| | |
| | |
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# Web Development

**For this question, we’d like you to demonstrate your skills with some basic web technologies. Please build your solution on http://jsfiddle.net/ and send us a link to your completed answer.**

For this question, we’re going to ask you to build a login form for a new and innovative startup named *BufferUnderrun*. The logon form will be accessed by visiting www.bufferunderrun.com/Auth/Logon, and the form will also post back to that URL to complete the logon. The form needs to implement some basic validation (using JavaScript) to ensure that neither the username nor password are blank when the form has been submitted.

Using your knowledge of HTML, CSS, and JavaScript, please build a form that meets these requirements.